Patent Claims

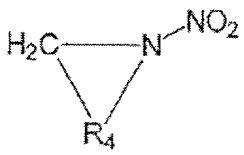
1. A method for producing a functional, high-energetic material with layered grain structure, containing an energetic plasticizer and a polymeric deterrent, characterized in that the plasticizer and/or the deterrent is or are diffused into the receptive grain in the form of a watery emulsion.

2. A method according to claim 1, characterized in that the grain is essentially composed of nitrocellulose, in particular of at least 80% nitrocellulose with a nitrogen content of 11-13.5%.

3. A method according to one of the claims 1 or 2, characterized in that the grain has a cylindrical structure with a diameter to length ratio of between 0.5 and 2.0, an outside diameter between 0.5 and 10 mm and, in particular, contains at least one hole, preferably several holes, with a hole diameter between 0.03 and 0.7 mm.

4. A method according to claim 3, characterized in that the grain is produced through compressing a solvent-containing powder dough of nitrocellulose in a molding press or by extruding it, wherein the solvent-containing powder dough contains in particular substances with the general structure III with R4 = (-CH2-N-NO2)n and n = 2 or 3, in a total share of 5-80% of the dry powder dough

substance, wherein the added substances preferably have the structures IV, V or VI and the total share of these substances in the absorbent grain is between 10-60%.



(III)

5. A method according to one of the claims 1 to 4, characterized in that a diffusion depth in the range of 100-500 µm is generated.

6. A method according to one of the claims 1 to 5, characterized in that a solution or emulsion of the high-energy plasticizer in an organic solvent is added to a mixture of untreated green powder in water, which is followed by the admixture of a solution or emulsion of the deterrent in water, wherein preferably the admixture of the solution or emulsion of the high-energy plasticizer in an organic solvent and the solution or emulsion of the deterrent in water occurs at a temperature between 20-85 °C.

7. A method according to claim 6, characterized in that the green powder to be processed is pre-soaked in an organic solvent in the reactor and is stirred during a

period of 4-24 hours at a temperature of 20-85 °C prior to adding the solution or emulsion of the high-energy plasticizer, which is liquid at room temperature.

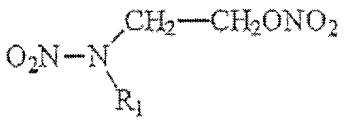
8. A method according to one of the claims 6 or 7, characterized in that the green powder is placed into 1 to 5 times the amount by weight of water.

9. A method according to one of the claims 6 to 8, characterized in that once the process of adding the solution or emulsion of the deterrent is completed, the pressure in the reactor tank is reduced to 400-800 mbar during a period of 2-6 hours and the remaining liquid components are allowed to drain out through a strainer in the bottom of the reactor and that the resulting powder mass is dried with warm air.

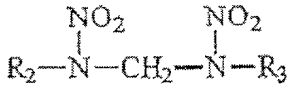
10. A method according to one of the claims 1 to 9, characterized in that 0.01-2% graphite is added in a polishing drum to the dried powder mass to obtain a bulk propellant powder with a bulk density > 1000 g/l.

11. A method according to one of the claims 1 to 10, characterized in that the high-energy plasticizer is nitroglycerine or diethylene glycol dinitrate or, in particular, is provided with the structure I or II with R_1 = C_1-C_{10}-alkyl, C_1-C_{10}-alkoxy or

aryl, R_2 and R_3 independent of each other C_1-C_5-alkyl or C_1-C_5-alkoxy and is used in amounts of 5-20% relative to the green powder.

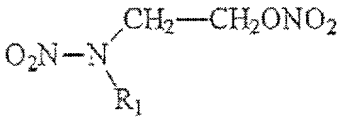


(I)



(II)

12. A method according to claim 11, characterized in that the high-energy plasticizer is provided with the structure I or II with R_1 = C_1-C_4 (methyl, ethyl, n-propyl, i-propyl, n-butyl, i-butyl, t-butyl) and with R_2/R_3 independent of each other C_1-C_2(methyl, ethyl).



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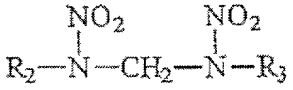
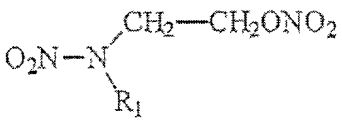


(II)

13. A method according to one of the claims 1 to 12, characterized in that an organic ether and ester compound with a molecular weight of between 100-100'000 is used as polymeric deterrent.

14. A functional highly energetic material with layered grain structure, formed with a high-energy plasticizer introduced into a green powder and a polymeric deterrent, characterized in that the high-energy plasticizer has the structure I or II, with R_1 = C_1-C_{10}-alkyl, C_1-C_{10}-alkoxy or aryl, R_2 and R_3 independent of each other have C_1-C_5-alkyl or C_1-C_5 alkoxy and is used in amounts of 5-20% relative to the green powder.



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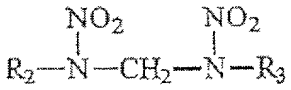
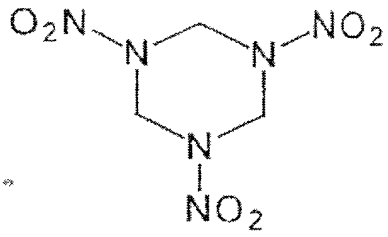


(II)

15. A functional, high-energetic material according to claim 14, characterized in that the green powder is produced by extruding a solvent-containing powder dough of nitrocellulose, wherein the solvent-containing powder dough contains substances

with the structures IV, V, VI, which form a total share of 10-60% of the dry substance for the powder dough.



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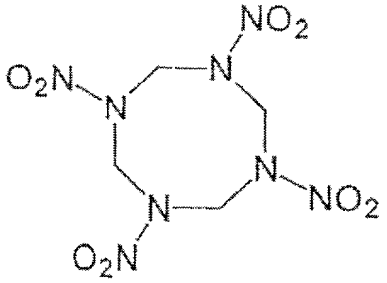

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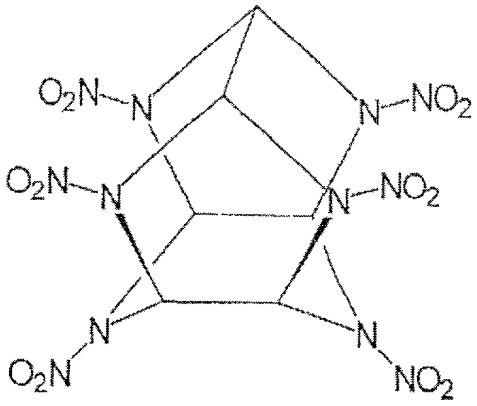
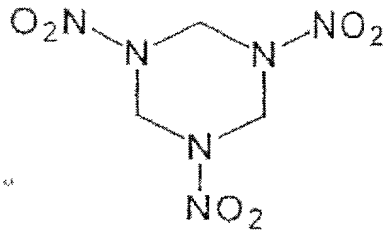


(VI)

16. A green grain for producing a functional high-energetic material with layered grain structure, containing a high-energy plasticizer and a polymeric deterrent,

wherein the green grain is formed by extruding a solvent-containing powder dough of nitrocellulose, characterized in that the solvent containing powder dough contains substances with the structure IV, V or VI that form a total share of 10-60 % of the dry substance of the powder dough.



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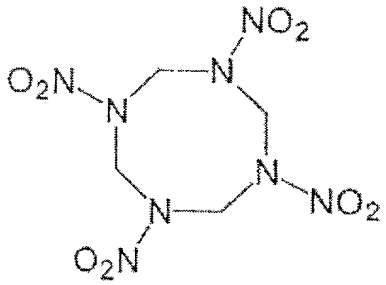

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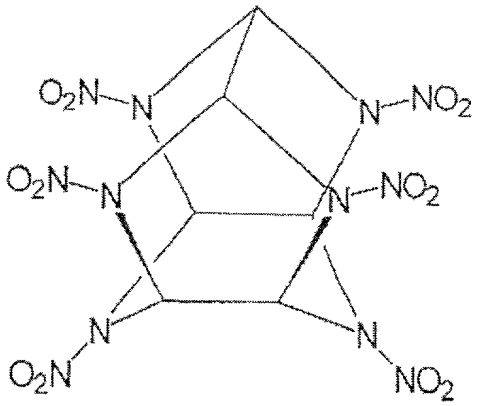

(VI)

17. A propellant containing a high-energetic functional material in accordance with claim 14.

18. Ammunition with a propellant powder according to claim 17.